IB-05

Defects on the ferroelectric and photocatalytic properties of La^{3+} ions doped $SrBi_2Nb_2O_9$ materials

Q. Lou[1,2], J. Zeng[1], L. Zheng[1], Zh. Man[1], W. Wang[3], A. Kassiba[4], C.H. Park[5], E.D. Politova[6], G. Li[1]

[1]*Key Laboratory of Inorganic Functional Materials and Devices, Shanghai Institute of Ceramics, Chinese Academy of Sciences, 200050, Shanghai, China*

[2]*University of Chinese Academy of Sciences, 100049, Beijing, China*

[3]*State Key Laboratory of High Performance Ceramics and Superfine Microstructures, Shanghai Institute of Ceramics, Chinese Academy of Sciences, 200050, Shanghai, China*

[4]*Institute of Molecules and Materials, UMR6283-CNRS, 72000, Le Mans University, Le Mans, France*

[5]*Department of Physics Education, Pusan National University, 46241, Gumjung, Pusan, South Korea*

[6]*Karpov Institute of Physical Chemistry, 105064, Moscow, Russia*

The effect of La doping on the efficiency of the photocatalysis of $SrBi_{2-x}La_xNb_2O_9$ ferroelectric powders and the ceramics synthesized by the solid state method is investigated. It is found that the photocatalysis efficiency is not always correlated to the polarization. As the content of La^{3+} ions increases, Raman spectra reveals that the La^{3+} ions prefer to occupy the Bi-sites in the Bi_2O_2 layers at a low doping content and they also replace Sr^{2+} in the A sites of the perovskite blocks ($SrNb_2O_7$) with further increasing La content. The leakage current decreases for the low La content x=0.02, but it increases significantly for higher x. The trend of the photocatalytic efficiency is correlated to the photocurrent and both are increased by the low La-doping of x=0.02, whereas they are decreased by the heavier doping of La, although the spontaneous polarization increases continuously with the La-doping. It is suggested that the role of the defects such as oxygen vacancy, Sr-vacancy, and various impurity states for the carrier transport plays the more important role than the spontaneous polarization in the heavily La-doped ferroelectric ceramics.